

THE EFFECT OF AN ADVANCE ORGANIZER ON THE READING  
AND RETENTION OF FOREIGN STUDENTS IN THE UNITED STATES

BY

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in the name of Allah, most Gracious  
most Merciful

To my wife, Haima Samerkandy, and both my sons, Basim  
and Basim, who share my aspirations and have shared my  
experiences. Together we have experienced the growth,  
humiliation, joy of discovery, confusion and  
strangement which are all part of living and studying  
in a foreign land,

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The purpose of this study was to evaluate the effects of an advance organizer in facilitating the learning of English by foreign students. Three groups of 40 students, American, Venezuelan, and Saudi Arabian, were randomly assigned to one of two subgroups. The experimental group was presented with an advance organizer and a learning passage to read once. The control group read the learning passage twice. All subjects were given a posttest after a week delay.

The three nationalities were selected on the basis of differences in home language and on the basis of cultural differences. It was hypothesized that there would be no significant differences 1) in the interaction between nationalities and treatments, 2) between experimental and control groups, and 3) between nationalities.



A two-way analysis of variance yielded no significant differences between nationalities by treatment interaction, and no significant differences between experimental and control groups across nationalities; however, there were significant differences across nationalities for each treatment. While both the Venezuelan and Saudi Arabian students were reading in a second language, the Saudi students also had a non-Western cultural background.

The results of this study do not support the theoretical position on the facilitative effect of advance organizers. Despite predictions that the advance organizer has greater facilitative effect on more unfamiliar material, the present findings do not support this position. The principle use of advance organizers in ESL (English as a second language) programs is not supported by the present findings. Further research should focus more specifically on the cultural differences of subjects as well as the effect of language differences.

## CHAPTER I INTRODUCTION

Many investigations relating to the dynamics and techniques of learning and retention in human subjects have been performed using conditioning procedures or discovery or rote learning tasks. Findings from such experiments are often generalized to the functioning of human learning and retention when the task involves the presentation of passages of written material to be learned. Perhaps such extrapolations are justified, but certainly they need to be substantiated by more experimentation with human cognition in which students are directly engaged in learning from acts of written materials.

Ausubel, in his book The Psychology of Meaningful Verbal Learning (1968), was concerned primarily with meaningful reception learning rather than rote learning, which involves memorization of arbitrarily associated bodies of information for which the learner lacks prior relevant knowledge. He advanced the hypothesis that the most effective way of increasing learning and retention of meaningful new verbal materials is by manipulating the organization, stability and clarity of concepts already established in the learner's cognitive structure. Ausubel

suggests that this cognitive structure manipulation can be best accomplished by the use of cognitive "organizers." He has formulated the concept of the "advance organizer," which is a set of related material presented prior to the new material and written at a higher level of abstraction, inclusiveness and generality than the new material (Ausubel, Novak, and Hanesian, 1978). Through this previously established organizer, the new ideas are then incorporated into the cognitive structure.

Although new facts and ideas may be incorporated into the cognitive structure, a second factor must operate if they are to remain available; that is, they must be maintained as discriminable entities from the higher level concepts under which they are subsumed. The advance organizer can serve this second function of maintaining the requisite discriminability. The advance organizer can facilitate discriminability by specifically delineating similarities and differences between the new materials and established concepts.

As seen by Ausubel, a third factor affecting retention is a seeming or real contradiction between the new material and the established concepts. Ausubel says that the individual upon encountering such contradictions will dismiss the new material as fallacious, will compartmentalize the new material and try to remember it by rote, or will attempt to reconcile the new material to the established structure. Chapter II of this study will review the experimental

studies which have been done by Ashraf and other researchers in this field.

Briefly, the principal function of the advance organizer is to bridge the gap between what the learner already knows and what he/she needs to know before he/she can successfully learn the task at hand (Ausubel, 1978).

### The Statement of the Problem

The purpose of this study was to examine the effect of an advance organizer on the reading and retention of students whose native language was not English and whose cultural background was non-Western.

Three groups of students participated in the study. The first group was non-native English speaking students with a western cultural background. The second group was made up of students for whom English was a second language and whose cultural background was non-Western. The third group, which served as the control, consisted of native-born American, English speaking students. Each of the three groups was subdivided into two sections ( $T_1$  and  $T_2$ ). The  $T_1$  subjects of each group were given the advance organizer followed by a learning passage which was read once. The  $T_2$  subjects received the same learning passage without an advance organizer and were instructed to read the learning passage twice.

The present study attempted to answer the following questions:

1. Are the differences in posttest scores between the treatment and control groups the same for American, Venezuelan and Saudi Arabian students?
2. Are there differences in posttest scores between students who read the advance organizer material before the learning passage and students who read the learning passage first?
3. Are there differences in posttest scores between American, Venezuelan and Saudi Arabian students across treatment conditions?

### Importance of the Study

The results of this study could be of importance in the field of educational research. From a practical standpoint, comprehension of written material is certainly one of the principal means of acquiring knowledge. Any method of presentation which can be shown to facilitate the learning process could be advantageous to all students. Of particular importance is the possible facilitation of comprehension of material which is written in a language other than the native tongue of the reader. What is, will advance organizers facilitate reading and comprehension for bilingual students or those in an English as a Second Language (ESL) program?

If the effectiveness of the advance organizer can be successfully demonstrated, its possible use in bilingual student programs should be examined in greater detail.

From a theoretical point of view, if the advance organizer technique results in better understanding and retention with this group of students (foreign students) the findings may be interpreted as support for Ausubel's theory on the effect of the use of advance organizers prior to the presentation of new material to be learned. Both Ausubel and Mayer predict that an advance organizer would be most facilitative when the material to be learned is unfamiliar. Thus, the present study may be viewed as an examination of this theoretical position.

## CHAPTER II REVIEW OF THE LITERATURE

The advance organizer concept of postinstructional material is based upon Ausubel's subsumption theory of learning. This model of cognitive organization assumes that the cognitive structure (i.e., the representation of past experience in the nervous system) "is hierarchically organized in terms of highly inclusive concepts under which are subsumed less inclusive subconcepts and information data" (Ausubel, 1968, p. 241). The principal function of the advance organizer is to bridge the gap between what the learner already knows and what he/she needs to know before successfully learning to do the task at hand. The advance organizer provides the student with (1) a general overview and (2) a way to organize the material.

Ausubel was primarily concerned with meaningful reception learning versus discovery learning. He pointed out that it makes good organizational sense if the presentation of detailed or specific information is preceded by a general or inclusive principle to which it can be related or under which it can be subsumed (Ausubel, 1968). This not only makes the new information more meaningful and enables the student to avoid some forgetting specific to the new

andly remembered generalizations, but also integrates related facts in terms of a common principle under which they can all be subsumed (Ausubel, 1978).

There has been a good deal of research on the advance organizer. Some studies support Ausubel's view that an advance organizer facilitates learning and retention, while other studies do not support this view.

### Studies Supporting the Advance Organizer

Ausubel's (1960, 1963 and 1968) and Fitzgerald's (1962) early research on advance organizers demonstrated that those learners who were given an advance organizer learned the material better and retained it longer.

Ausubel and Fitzgerald (1961) found that college age subjects of high verbal intelligence did not profit from the presentation of advance organizers while those with relatively low verbal ability did profit. Similarly, Smith and Lenz (1968) reported that advance organizers worked better with poor readers than with better readers.

Dalton, Ames and Anderson (1968) reviewed 124 empirical studies of advance organizers and learning and retention. Using a meta-analysis technique, they examined different variables such as grade level, subject areas, organizer presentation modes, and subject ability level. This study indicated that advance organizers provide a small but consistent facilitation effect on long term learning and retention in all content areas examined.



Bartley and Davies (1974) compared the effects of preinstructional strategies, such as pretests, behavioral objectives, overviews, and advance organizers. They reported that advance organizers worked best with university students and above average school age children in clarifying unfamiliar information. Levine and Banks (1973) defined advance organizers and stated two conditions for meaningful learning: (1) the learner should already have appropriate background material in his/her cognitive structure, and (2) the content should be valid. Romberg and Wells (1979) studied the effect of advance organizers in the learning of concrete models of abstract mathematics and reported that significant differences in retention favored the advance organizer condition.

Revel and Olajide (1980, in their study, "Imagery, Concreteism and Advance Organizers," examined the attributes of prose passages used as studies of advance organizers. They used the material developed by Rube and Novak (1971), *i.e.*, the prose learning passage on homeostasis and the "flora and fauna" advance organizer. The purpose of the study was (a) "to demonstrate a reliable method of determining the attributes of prose material on a concrete-imagery continuum, and (b) to evaluate the effects of an advance organizer and a learning passage on learning and retention when the attributes of these passages are defined on a concrete-imagery continuum" (Revel and Olajide, 1980, p. 2). The students participating in the study were asked

to rate the paragraph inference organizer. Learning passage and an historical passage using a 10-item rating scale of the semantic differential type, developed by Ross and Howell (1972). The advance organizer and the prose passage were rated significantly higher on meaningfulness, concreteness and perceptual aspects than was the historical passage. The 10-item multiple choice test developed by Bata and Novak (1972) was also administered to the six student groups used in this study.

In the second phase of the study, a different group of students was used to determine whether or not the advance organizer facilitated learning of the prose material on homocentres. There were six treatments involved here,

1. Advance organizer plus learning passage.
2. Historical passage plus learning passage.
3. Learning passage alone.
4. Advance organizer alone.
5. Historical passage alone.
6. None of the prose passages.

Significantly higher test scores were produced by the first group. This group performed better on the retention test than did the historical passage plus learning passage group or the learning passage only group. The third group who read only the learning passage did better than the group given only the advance organizer, but these results were not statistically significant. The historical passage and learning passage group produced lower scores than did the

learning passage alone group. Lastly, those students who received only the advance organizer received better scores than those who received no prose passages to read but had been asked to take the posttest anyway.

Carrolline, Foxley, and Fowler (1979) used advance organizers to improve comprehension of a content test among 34 seventh grade students in a junior high school. Subjects were randomly assigned to one of three treatment groups; all three groups were given written materials. Group 1 was instructed to read the chapter and answer the questions at the end. Group 2 was given the same instructions and also was directed to skim the chapter first. Group 3 received the same instructions as the other groups and in addition was given as an advance organizer a written handout. One week later all groups were given an identical multiple-choice questions test. This study indicated a significant difference favoring the advance organizer group.

Kuhn and Bork (1971) found that there is a significant difference between the results obtained on posttests given immediately compared with results of posttests administered three weeks later. The classes who received the advance organizer treatment demonstrated better retention.

Leach and Johnson (1974) examined four types of advance organizers which they used to introduce a 30-minute self-instructional unit about elementary concepts in motion geometry. One type of organizer used several simple applications to introduce intuitively the ideas that were in

the units another type of organizer used only a single application; another used several concrete models; and the fourth used a single concrete model. In addition to comparing the four types of organizers, experimental treatments compared children who received an organizer before reading the basic unit (advance organizer) with children who received an organizer after they had completed the basic unit (post-organizer). That study involved 240 fourth graders and 240 seventh graders from four north Chicago schools and the research results indicate that for both groups of subjects the advance organizer groups scored significantly higher than the post-organizer groups. However, it is important to point out that the posttest was given immediately after the instructional unit was completed. Also, the results of the study showed that advanced organizers can be effective under certain conditions; such conditions include the type of material and the grade level of students.

Reble and Bastone (1974) studied the effect of a series of advanced organizers in increasing meaningful learning among grades nine and ten in a rural school. The subjects were divided into two groups, experimental and control. The experimental group received the advance organizer before the material to be learned and the control group received material prefaced with a historical narrative. A significant difference was found in favor of the

advance organizer group as measured by a cumulative achievement test.

In most of the previous studies subjects were given the written advance organizers with learning passage, but Deason (1972) examined the effect of an oral advance organizer with a learning passage as compared to the effects of a written organizer. He discovered no significant differences between the two methods of instruction when using undergraduate university students as subjects.

### Nayer's Theories

Richard E. Nayer (1979a) presented four theoretical positions concerning the effects of advance organizers and also suggested tests that should be applied to such research. Nayer's four theories are listed below.

1. Information Theory posits that test performance depends on the amount of information received by the learner. The speed of presentation and the learner's motivation determine the amount of information transferred to the learner's memory. This theory predicts "that if the test measures content from the instructional material, then preteaching an organizer before, after, or not at all should have no effect on test performance" (Nayer, 1979a, p. 314).

2. Assimilation Theory states that more is learned if the learner possesses prerequisite anchoring concepts. After Nayer, conceptual anchoring "is the idea that fundamental conceptual ideas from the text will be integrated with

existing knowledge and thus lead to better transfer" (Mayer, 1978a, p. 373).! This theory predicts that presenting an advanced organizer before learning should result in more acquisition of knowledge than presenting the organizer after learning.

3. Assimilation/Encoding Theory involves the active integration of new information with existing knowledge, and attempts to achieve a learning outcome which varies in breadth rather than only in amount retained. This theory predicts that giving the advanced organizer before learning may result in a broader learning outcome.

4. Exclusion Theory proposes that advanced organizers serve as a retrieval aid rather than a learning aid. This theory predicts that there should be no difference in test performance between subjects given the advanced organizer before or after learning.

Mayer conducted nine tests of the above theories. Paper's discussion of these tests is too lengthy and detailed to be presented here. Interested readers are referred to Mayer (1978a, pp. 374-381). The important and pertinent point is Mayer's conclusion. He states, "These tests clearly favor an assimilation encoding theory, and provide consistent evidence that advance organizers can influence the outcome of learning" (Mayer, 1978a, p. 374). He then restates even more emphatically, "Advanced organizers, when used as appropriate signposts and when

evaluated properly, do appear to influence the outcome of learning" (Royer, 1973a, p. 311; Royer's emphasis).

In his report, "Twenty Years of Research on Advance Organizers," Royer (1973a) reviewed 44 published research studies on advance organizers. Twenty-seven of the studies were of the "standard advance organizer study" type, i.e., an advance organizer vs. a control group was used. The remaining 17 studies were of the "modified advance organizer study" type employing an advance organizer vs. a post-organizer group. The study results were analyzed in regard to the predictions of Royer's (1973a) theories, cited above.

Additionally, the following predictions of assimilation theory were examined:

1. Advance organizers will more strongly affect the learning of a poorly organized text than that of a well organized text.
2. Advance organizers will have a stronger effect for learners lacking in prerequisite knowledge and/or abilities.
3. Advance organizers will have a stronger effect on transfer rather than retention.

The main, broad objective of Royer's study was to determine if the results of twenty years of advance organizer study do, in fact, support assimilation theory. Briefly, assimilation theory holds that learning consists of connecting new ideas with old ideas. Advance organizer studies are a means of testing the validity of assimilation theory, and as Royer points out, after twenty years of

study, there is an extensive quantity of data to be reviewed.

Examination of the pertinent results of the 17 studies indicated that in 13 of the studies the advance organizer group performed better than the control group. Thirteen of the studies showed better performance for the advance organizer group, especially where the subjects were lacking in ability or prerequisite experience. This better performance was also demonstrated when poorly organized texts were utilized and when the subjects measured transfer rather than retention. There were only four studies in which the advance organizer group's performance was not superior to that of the control group.

Hayer's report does not maintain that the above results are unequivocal proof that advance organizers significantly improve learning. There were many varying factors in the studies under consideration which could have influenced results, e.g., failure to control for placement of the advance organizer, so it could not be determined whether the advance organizer serves as a retrieval or an encoding device. Hence, although the studies do show that advance organizers result in small but consistently better results, more strictly controlled tests are needed.

Of the 17 modified advance organizer studies reviewed by Hayer, four showed better performance for the advance organizer groups, six showed better performance for advance organizer groups in certain situations, and seven of the



studies showed little or no variance between the advance organizer and post organizer groups. These studies involved giving one group an organizer in advance of the material to be learned and giving another group an organizer after the presentation of learning material (post-organizer). Assimilation theory (and addition theory) would expect better results from the advance organizer groups, whereas reception theory would not expect any significant score differences at the posttests. Hager found that the results of these studies do provide some support for assimilation encoding theory. Even though seven of the cases did not statistically support this theory sufficiently, reasons for this failure were evident. For example, four of the studies did not report mean scores for the advance organizer and post organizer groups.

In a further attempt to uncover evidence in advance organizer studies which would be supportive of assimilation theory, Hager critically reviewed the studies with a view to certain assimilation concepts. In this section he evaluated the following:

1. Materials--Assimilation theory predicts that advance organizers are more effective in learning a poorly organized text or one in a technical format. The use of an advance organizer with well organized (familiar format) material, whose principles and ideas are well connected, would not improve performance and could even adversely affect the learning process. Reception theory predicts no

significant difference. Four studies were considered and consistently gave support to the assimilation theory.

2. **Learner characteristics**--Learners with extensive experience or high ability would not profit from the use of advance organisers, according to assimilation theory, as would learners of less experience and low ability levels. The more experienced subject already has many of his own assimilation sets and the ability to connect new knowledge to old. Therefore, use of an advance organiser should not significantly affect his performance. These beliefs were upheld in studies where a pretest was administered to determine participants' prior knowledge of and ability to learn the subject matter. Assimilation theory predicts that high ability subjects will spontaneously use their assimilation sets and anchors without being directed to do so. Verbal ability is also very important. Both Ausubel and Townell (1963) and Ausubel and Fitzgerald (1968) produced results showing greater effect for advance organisers with poor readers than for high verbal ability subjects.

3. **Subclassified Posttest**--The strict version of assimilation theory implies a stronger effect of advance organisers on far transfer (the transfer of general conceptual ideas) than for near transfer (the transfer of specific technical facts) as retention, i.e., a broader, more integrated learning result. The more lenient version of assimilation theory (inclusion theory) predicts improvement of all learning measured on the posttest. Reception theory

would, of course, predict no difference. Ten of the studies used unbalanced posttests. Mayer concluded that the use of advance organizers had a strong effect on far transfer or conceptual posttest questions. This finding was most evident on posttests having many types of questions.

### Mayer's Conclusions and Recommendations

Generally speaking the tenets of assimilation theory are supported by this review of twenty years of study concerning the use of advance organizers. A small, consistently positive effect is shown for advance organizers in studies using advance organizers vs. control groups and advance organizers vs. post-organizer groups. This is especially evident where the prior indicated conditions are met. Namely, the advance organizer seems most effective when used with poorly organized, unfamiliar material and/or when used with limited experience and/or low ability subjects. For future studies, Mayer offers several recommendations. Future studies should be larger scale and directed toward a specific aspect of assimilation theory. Studies should focus on the effects of advance organizers with various types of material and different types of learners. Tests used in future studies should include many levels, including retention and far transfer. There should be more specific information given in future studies concerning the "advance concepts" used in the advance organizers and how these concepts relate to the instructional information.

### Studies Critical of the Advance Organizer

There have also been studies critical of the advance organizer effect. Most opponents criticize the definition of the advance organizer, maintaining that it is not an operational definition and is confusing. Barnes and Clemens (1974) reviewed 11 studies of advance organizers and reported no clear effects of the advance organizer condition in 10 of the studies. They then offered nine recommendations for the improvement of research using advance organizers. They concluded that, although the use of advance organizers has been experimentally examined for more than 20 years, there is as yet no conclusive evidence to confirm the validity of their role in the learning process.

Robinson, Allen, and Lapan (1975) suggest that some of the discrepancies in study results may be explained by differences in the population samples represented in the individual studies. Furthermore, certain studies indicate that even when college students are selected as study subjects, ability levels vary greatly. Mayer (1976) found that college students with above average mathematical ability readily assimilated information on computer programming without being exposed to an advance organizer. Students with lower mathematical skill levels, however, significantly improved their performance when an advance organizer was administered.

### Summary of Advance Organizer Studies

It is apparent from related research that the advance organizer may be most useful with subjects who are in some way disadvantaged, e.g., their academic ability is below average or their cultural background varies from the norm.

All the studies cited above used American students who have American-Western culture backgrounds. One issue not previously studied is whether the advance organizer will facilitate learning and retention among foreign students who are studying an English prose passage when these students do not have English as their primary language. In addition, there is no information about the effect of advance organizers on students who come from non-American Western cultural backgrounds.

### Factors and Their Language: Cross-Cultural Aspects of Concept Formation

Nobody denies the influence of culture on an individual's concept formation. Greenfield and Bruner (1966, 1971) and Greenfield, Bulch, and Oliver (1964) have done experimental studies among the Hopis in Arizona which have led to a modified view of linguistic relativism; that is, cultures differ with respect to the ease with which they code a particular area of experience in language. An interesting example of the relationship between language and "reality" comes from Greenfield and Glaser's (1971) work with a Nyma Indian tribe. The Aymara Indians' native tongue

has only five basic color terms, plus a single term to describe pink and white, and another single term to describe orange and red, although it is possible to specifically label each color distinctively by using Spanish loan words. Greenfield and Childs (1971) showed a strong relationship between a child's ability to encode similar colors distinctively and differentiate these colors in patterns in woom material, a non-linguistic measure of cognition. Looking at the association between distinctive color terms and color hues, they found reliable correlations between incorrect encoding and the substitution of pink for white and of orange for red in pattern construction.

Many cultures lack generic terms for categories, while having well-developed lexicon for naming distinctions within the same categories. Examples include the Laplanders who lack the generic term for snow, while having many names for kinds of snow, and the Masami of Brazil who lack a generic term for palm trees and parrot, while having many names for different kinds of palm trees and parrots in their avifauna nest (Werner, 1976, p. 184).

Giles and Scribner (1978) take the position that the "filtering" effect of language may well be greatest in respect to phenomena that are definable not in terms of physical properties, but in terms of attributions that are culturally specified, such as social roles and ideology, where concepts largely acquire their meanings through being embedded in an explanatory verbal account. It is here that

language may play the greatest role in shaping people's view of reality, in influencing their thinking processes, and in contributing to their understanding or misunderstanding of other cultures. A good example is the different definitions of "freedom among people in the Communist part of the world and in the Western part" (Meehan, 1978, p. 174).

As a native speaker of the Arabic language, this writer has observed certain obvious differences between his first language and other languages. However he is not a linguistic expert or even a specialist in the Arabic language, he would not attempt to analyze these differences. However, as a writer of instances, a few points can be made. For example, Arabic is written from right to left whereas English, Romance languages and generally all Western languages are written from left to right. The reason one language should be written and read one way and another written and read the opposite is uncertain, but there is probably some cultural difference manifested in this shape of writing direction. It could be that this language difference, in the reading and writing direction, somehow influences the perception of the individual.

As mentioned above, the main purpose of this study is to investigate the effect of an advanced organizer as a preinstruction aid to foreign students in the United States of America who gain their information from English as a second language (L2) compared with American students who speak English as a first language (L1). In other words,

this study will not explore the relationship between language and culture, but it will concern itself with two major issues:

1. The learning process of adults in second-language acquisition.

2. Methods of teaching in a second language.

### Second Language Learning Process

Many researchers make a strong case for the comparability of L1 and L2 processes (Trapp, 1974). The fact remains that L2 learners are in very different situations than children learning their first language. Many other researchers point out that L2 learners are older and smarter, already have some knowledge of at least one language, and probably have a very different motivation for learning their second language than they did for learning their first language (Trapp, 1974). Age and previous linguistic knowledge are two differences between L1 and L2 learners.

A number of different theories exist regarding the relationship between age and L2 learning: (1) the biological argument, (2) the cognitive argument, and (3) the affective argument.

### The Biological Argument

The popular notion that younger language learners have the best chance of being successful is largely due to



"critical period theory" in L2 learning. The idea of a critical period is actually based on studies of animal behavior and was extended to language learning by Lenneberg (1967) among others. Lenneberg (1967) points that there is a period during which language learning must take place and after which a language can never be learned in quite the same way. Thus, for Lenneberg, the idea of a critical period for L2 learning seems tied to the idea that lateralization (specialization of functions of different hemispheres of the brain) takes place in the brain around puberty. Lenneberg even extends the notion of the critical period to L2 learning, suggesting that though we are able to learn a second language as adults, the learning process itself differs. Postpubescent language learners must make "a conscious and labored effort" (Lenneberg, 1967, p. 176). To learn a second language the number of obstacles in the language learning process increases after puberty, and the speech of older learners is marked by foreign accents.

Critical period theory has become the subject of debate, and one question is of particular interest to L2 teachers: Is there a qualitative difference in the way adults and children learn a second language (Chen, 1980)?

Krashen (cited in Chen [1980]) does not agree with Lenneberg regarding the role of lateralization in language learning, or the age at which it takes place; he does not see a qualitative difference between adult and child L2 learning. While he feels that adult second language "acquisition" is

basically effortless and subconscious, he believes that adults also use conscious means to "learn" a second language.

### The Affective Argument

Taylor (cited in Chen [1982]) believes that affective factors such as motivation, anxiety, and ego boundaries distinguish adult and child L2 acquisition. The differences which exist between adult and child L2 learning are quantitative rather than qualitative.

### The Cognitive Argument

Assael (1980) and Assael et al. (1974) indicated that the L2 learner is in a much different psychological position from that of the L1 learner in terms of the basic vocabulary and the syntactic code of the language. And the L2 learner is capable of comprehending and applying formally stated syntactical propositions. Assael et al. state,

Just as we learn to read by establishing experiential correspondences between new written symbols and familiar, already meaningful spoken symbols, and by reconstructing written into spoken messages, so we do learn new language symbols (both spoken and written) and their already meaningful native-language counterparts, and by reconstructing foreign language into native language messages. (Assael et al., 1974, p. 74)

Assael believes that methods of teaching a second language to adults should not necessarily follow the same sequence of steps as first language acquisition, because of

children's cognitive immaturity and lack of certain intellectual skills (Mandel et al., 1978, p. 78).

Bruner and his associates (1989) postulate a series of striking developmental changes in the ways children represent their experiences of the world. According to Bruner et al., children's representations are (i) by habitual action (enactive), (ii) by imagery free of action (iconic), and (iii) by translation of actions and images into symbols via language (symbolic). They assume that different cultures provide different "experiences" for children's cognitive growth. These experiences channel children's attention, through tactual or auditory cues, through visual cues, or through symbols. Without special training in the symbolic experience of representation, a child may grow to adulthood still depending in a large measure on enactive or iconic modes of representation in organizing the world. It is assumed that the acquisition of the second language comes by the same processes as the first one.

### Conclusions

It appears that there was an agreement concerning the learning process acquisition and method. Since the purpose of this study was to investigate the effect of advance organizers specifically among foreign students who have learned English as a second language, the results may be useful in organizing future programs for international students. Improving learning methods for foreign students

would enhance their prospects of success and support the principle of equal opportunity for all.

Both Aschell and Meyer proposed circumstances under which advance organizers would be most effective. These include lack of prior background and limited information in cognitive structures the use of a non-Western, non-English group and a Western, non-English group should contribute to the theoretical positions presented by Aschell and Meyer.

## CHAPTER III METHODS AND PROCEDURES

The experimental design in this study consisted of a "posttest only" design. Two different treatments were used on three distinct nationality groups. One of the groups, comprised of English-speaking American subjects, provided performance scores which served as a baseline or control measure for the other groups in the study.

### Materials

#### Materials

The prose materials, written in English, used in this study were developed by Kahn and Kevak (personal communication) and consisted of a passage of approximately 800 words dealing with the topic of biological homeostasis. The advance organizer was a prose passage consisting of about 100 words explaining the use of a float and valve mechanism in regulating the flow of water in and out of a storage tank. A copy of these materials is included in the Appendices B and C.

These materials have been used not only by Kahn and Kevak but also by Maxwell and Slajack (1960) and Yoon and

Newell (1977). The results of these studies already have been discussed in Chapter II. It was believed that the subjects in this study were unfamiliar with this topic.

The advance organizer was introductory material based on the learning passage. It consisted of ideas which were more abstract, more inclusive, and more general than the learning passage itself (Ruhn and Novak, 1971; Newell and Olejnik, 1980).

It is appropriate to note that Professor Tom Filler of the Department of Instructional Leadership and Support, University of Florida, computed the reading difficulty level of these two passages (the advance organizer and the learning passage).

On the Fry Graph, the advance organizer range was from 100th-121st grade with the average just on the line between 11th and 12th grade level of difficulty, and the learning passage ranged from 11th grade to college with an average of college level difficulty. In light of these results, it was determined that the difference in reading difficulty levels of the two passages would not be a significant factor. In other words, the difficulty level of the two passages has been controlled.

### Test

The retention test on hemochromatosis consisted of 20 multiple choice items. The instrument has been used and analyzed by Ruhn and Novak (1971), Newell and Olejnik (1980)

and Yoon and Howell (1971). Kahn and Lynch, using the split-half method, found the test to have a reliability coefficient of .78 for American undergraduate elementary education majors in a biology class. It was felt that this reliability indicated appropriate and sufficient psychometric characteristics.

### Subjects

Since the focus of this study was the effectiveness of an advance organizer prestructuralist strategy on the learning and retention of English language prose read by non-native speakers of English compared with American native speakers of English, the following group compositions were selected for the research. Three separate nationality groups were chosen. Group I was 40 Venezuelan students whose home language is not English but whose cultural background is Western. Group II was made up of 48 Saudi Arabian students whose native language is Arabic and whose cultural orientation is non-Western. The third group was composed of 48 American students who are native English speakers with a Western cultural background. The Americans served as a control group for both ethnic groups. Table 1 summarizes the pertinent characteristics of the subjects involved in this study.

The 48 Arabian students were enrolled in two undergraduate academic courses, Educational Psychology (EDU 431B) and Cost and Management Accounting (ACC 3481),

Table 1  
Characteristics of Subjects

	48 Under- graduate American Male Students	40 Under- graduate Venezuelan Male Students	40 Under- graduate Saudi Arabian Male Students
English language fluency	Native language	Second lang- uage: minimum raw score of 410 on TOEFL	Second lang- uage: minimum score of 410 on TOEFL
Academic level	3,3,3 non-Biology major	3,3,4 non-Biology major	3,3,4 non-Biology major
Growing up	In USA	Not in USA	Not in USA
Parents' first language	English	Not English	Not English
Age	18-20	20-24	19-24
Marital status	Only 3 married	Only 3 married	Only 3 married



during the 1983 Spring term at the University of Florida, Gainesville, Florida.

2. The 48 Venezuelan students were enrolled for the 1983 Spring term at the University of Florida and Santa Fe Community College, Gainesville, Florida.

3. The 48 Saudi Arabian students were enrolled for the 1983 Spring term at the University of Miami, Coral Gables, Florida.

Each nationality group was randomly divided into two subgroups, an experimental group and a control group. Table 2 shows the subgroup breakdown.

No difficulty was experienced in finding American subjects to participate in this study as they were already

Table 2  
Subgroup Breakdown

<u>Composition</u>	<u>Treatment</u>	
	SD+LP, (Experimental group) = $T_1$	LP & L (Control group) = $T_2$
$C_1$ = American	20 subjects	20 subjects
$C_2$ = Venezuelan	20 subjects	20 subjects
$C_3$ = Saudi Arabian	20 subjects	20 subjects

standing classes in which participation in the experiment had been encouraged, and the experiment was conducted during class time. However, great difficulty was experienced in finding both Saudi Arabian and Venezuelan subjects. First, a request for the largest Saudi Arabian student population in Florida was sent to the Saudi Arabian Educational Services. A list of 50 Saudi students, from Miami, was then received. Letters were sent to these 50 students with the incentive of a \$10 payment and a certificate of recognition after their participation. However, only two of the 50 students responded positively.

Letters again were sent to the rest of the 50 students asking their voluntary help and informing them of a time and place for attendance. Thirty-four Saudi Arabian students attended the first appointment. Those who attended were also asked to encourage their Saudi friends and classmates to attend another appointment which added eight more Saudi students.

A list of 50 male undergraduate, Venezuelan students was obtained from the International Student Center of the University of Florida in Gainesville. Letters then were sent to the 50 students with the same incentive and request previously sent to the Saudi Arabians. Ten out of the 50 attended the appointment. It was then decided to hold a party for the first 34 participants. The purpose of the study was indicated in the announcement for the party.

and the students were encouraged by food and beverages after finishing the task.

Both Iraqi Arabians and Yememians were told that they would neither receive the EIL nor the recognition certificate unless and until they attended a second meeting (for the posttest) a week after their first meeting (for reading the learning passage).

The subjects were divided randomly into two equal groups--the experimental group ( $T_1$ ) or the control group ( $T_2$ ). There was no pretest or any other type of pre-assessment carried out. Such techniques were waived because of the difficulty of gathering the students together, and such tests might have been invalid for the foreign students. The TOEFL test was judged to be a sufficient measure of English proficiency for the foreign students. All subjects had been admitted to two respected American universities and thus was considered adequate evidence of general academic ability.

### Procedures

A total of 118 subjects were involved in this study. There were, altogether, six subgroups which are summarized in Table 1. There were no different treatments administered. The experimental groups received the advance organizer plus the learning passage with instructions to read the material once only. The control groups were given only the learning passage and were instructed to read it twice. The

materials were randomly distributed to the subjects so that they were assigned randomly to the experimental and the control groups. Sufficient allowable time for the reading was 45 minutes. One week from the date of the reading, a post-test on the content was given.

### Dependent Variable

There was one dependent variable under investigation in this experimental study, specifically, the correct responses to a set of questions. The dependent variable measured the quantity of learning and retention that had taken place and was considered dependent upon the independent variables.

### The Independent Variables

There were two independent variables in this experimental study, (1) treatment and (2) nationality of the students. There were two treatments. As previously indicated there was the presentation of (a) an advance organized plus learning passage, and (b) a learning passage only treatment. Three distinct nationality groups were utilized in the second independent variable: American, Venezuelan and South Arabian. All were male undergraduate students. (See Table 1.)

### Design and Main Hypotheses

A two-way ANOVA was an appropriate analysis procedure for this study (Wack, Carrier, Bonds, 1974; Glass and

Steeley, 1976) to determine if there are any significant differences between groups and treatments in performance on the maze posttest.

The two-way ANOVA has three null hypotheses, one for the main effect of each independent variable and one for the interaction.

1. The null hypothesis of interaction is

$$H_0: (\mu_{ab} - \mu_{a.} - \mu_{.b} + \mu) = 0 \text{ for all } ab;$$

that is, there is no difference among the "ab" cell means that cannot be explained by differences among either the "a" means or the "b" means or both. The data analysis was executed by the IBM 370 Model 45 system, at the University of Florida, using the Statistical Analysis System (SAS) (SAS Users Guide, 1983).

2. The null hypothesis for the treatment population means is

$$H_0: \mu_{t_1} = \mu_{t_2},$$

where  $t_1$  is the treatment with advance equipment plus learning passage, material used one time only, and  $t_2$  is the control with the learning passage only, used twice. That is, there is no significant difference between the treatment population means.

3. The null hypothesis for the anticonvulsant (untrained) population means is

$$H_0: \sigma_1^2 = \sigma_2^2 = \sigma_3^2$$

that is, there is no difference between the country population means where

$\sigma_1$  = American subjects

$\sigma_2$  = Venezuelan subjects

$\sigma_3$  = Hindi, Arabian subjects.

## CHAPTER IV RESULTS AND ANALYSIS

Previous chapters have presented the problem of the study, reviewed related studies, presented the methods and procedures of this study. This chapter presents the results of this study. One hundred twenty students of three nationalities, American, Venezuelan, and Saudi, were administered a posttest. Each nationality is represented by 40 students and has two levels of treatments. The experimental group received the stimulus organizer plus the learning passage (to be read again); the control group read the learning passage twice in order to equalize the experimental group. Then, 10 subjects in each of six cells completed the posttest. The scores on the posttest represent the dependent variable. Table 3 summarizes the design matrix of the study.

Before testing the hypothesis of interest, the assumptions of the analysis procedure were tested. The parametric assumptions that underlie the mathematical derivation of the analysis of variance are the following:

1. The samples were random samples from defined populations.
2. The samples were independent.

Table 3  
Design Matrix of the Study

Nationality	Treatment	
	Experimental Group ( $T_1$ )	Control Group ( $T_2$ )
American ( $O_1$ )	$N = 18$	$N = 18$
Vietnamese ( $O_2$ )	$N = 18$	$N = 18$
South Arabian ( $O_3$ )	$N = 18$	$N = 18$

3. The dependent variable was measured on at least one interval scale.

4. The dependent variable was normally distributed in the population(s).

5. The population variances were equal.

Repeated studies have shown that ANOVA is robust with regard to violations of normality and equal variances when sample sizes are equal. However, when two or more of the assumptions underlying the analysis of variance are not met, the probability statement becomes deceptive. That is, instead of operating at the designated level of significance, the actual type I error rate may be greater or less than the assigned  $\alpha$ , depending on how the assumptions were violated. An excellent treatment of this topic is Glass, Peckham, and Sanders (1972). In the present study, equal numbers of subjects in each cell were assigned randomly.



Several approaches were used to test for the violation of these assumptions. To test for the assumptions of equal variances, test the hypothesis

- Ho: Partial Variance  $\sigma_1^2 = \dots = \sigma_k^2$  against  
 Ha: the variances are not all equal.

The test most often used, called Bartlett's test, is based on a statistic whose sampling distribution is approximately equal very closely by the Chi-square distribution when the  $k$  random samples are drawn from independent normal populations. However, there are other methods available, e.g., a method of Cochran's. This method provides a computationally simple procedure, but it is restricted to equal sample size situations. Cochran's test is particularly useful in detection if one variance is much larger than the others (Walpole and Myers, 1978, p. 373). The statistic used is given by

$$g = \frac{\text{Largest Variance}}{\text{Sum of Variances of the Cells}} .$$

The variances are unequal when  $g$  is greater than  $g_{\alpha, h, n}$  which are obtained from statistical tables with the specified level of significance  $\alpha$ , number of cells  $h$ , and the cell size  $n$ . Table 4 reports cell means and variances. The largest variance was 9.418 for the control group of Venezuelans, and the sum of the variances of the cells is 33.189.

Table 4  
Means and Variances of the Six Groups

Country and Treatment	N	Mean	Variance
$C_1T_1$	25	16.18	7.740
$C_1T_2$	25	16.16	5.892
$C_2T_1$	25	9.18	8.811
$C_2T_2$	25	9.43	8.418
$C_3T_1$	25	4.53	4.344
$C_3T_2$	25	7.53	5.102

$C_1$  = American

$C_2$  = Venezuelan

$C_3$  = Saudi Arabian

$T_1$  = Experimental Group

$T_2$  = Control Group

Then  $q = \frac{1.128}{\sqrt{\frac{1}{12} - \frac{1}{100}}} = 6.18$  which is less than .51 (for  $n = 10$ ), but more than .34 (for  $n = 31$ ). There is no table value for  $n = 10$ ; however, it does, by interpolation, equal .3845 (Guipole and Myers, 1978, p. 431). Therefore it was concluded that all variances were equal and that the homogeneity assumption was not violated.

The normality assumption was investigated by examining the residual plot (Figure 1). The results of this plot

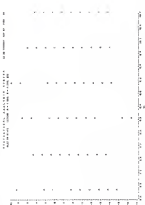


Figure 1: Residential Plot

indicate that the assumption was met. Since tests were administered to the students independently and the students responded individually, the assumption of independence was met.

The two-way ANOVA was used to test for three null hypotheses, one for each independent variable and one for the interaction. A summary of the analysis is presented in Table 5.

1. The first null hypothesis for the interaction can be stated as follows: There is no significant interaction between levels of the two independent variables. That is, differences between the experimental and the control groups are the same for each nationality.

Table 5 presents the ANOVA summary table to test the hypothesis of interest. The  $F$  ratio for the interaction is .47 with a  $p$  value of .4981. Since the probability of the

Table 5  
ANOVA Summary Table

Source	df	SS	MS	F	p
Q (Nationality)	2	104.7	52.35	14.83	.0001
T (Treatment)	1	15.2	15.2	4.7	.0333
QxT	2	4.45	2.225	.67	.6283
Error	214	812.88	3.80	--	--

observed  $F$  value was greater than the .45 level chosen as the criterion of statistical significance, it was concluded that there was insufficient evidence to reject the null hypothesis of no interaction. Differences between the experimental and control groups were the same for all nationalities.

3. The desired null hypothesis was stated as follows: There is no significant difference between levels of treatments for American, Venezuelan or Swedish. The means of treatment were 8.32 for the experimental group and 8.12 for the control group. The  $F$  ratio was 3.78 (Table 10) with  $p$  value of .1631 which was greater than .05; therefore, the hypothesis of no difference between treatments one and two across the three nationality levels was not rejected. Students who read the advanced organizer material did not score significantly higher than students who read the learning passage twice.

As a point of interest, in reviewing the data of Swell and Gipeck (1964), it was noted that the third group, consisting of 18 students, which received only the learning passage to read once had a mean score of 16.87 with variance of 8.21 compared with the American control group used in this study who had a mean score of 16.35 with variance of 8.442. Using the  $t$  test procedure, it was found that there was no significant difference at level .05 between the mean scores of the two control groups, i.e.,

those who read the laughing passage were compared with those who read it twice.

3. The third null hypothesis tested was for the nationality population means and was stated as follows: There are no significant differences among levels of nationalities across the treatment levels. The three nationality means were 14.275, 9.425, and 7.65 for Americans, Vietnamese, and Saudis, respectively. The F was 14.43 with p values of .0001 which was less than .05; therefore, the hypothesis of no difference among nationalities was rejected. This conclusion requires a follow-up analysis to specify where the difference exists and to identify which nationality had the highest and lowest test scores.

#### Follow-up Analysis and Identification of Specific Differences

To identify specific differences between nationalities a procedure suggested by Tukey was used (Hinkle, Wiersma, and Jurs, 1982, p. 188). This choice was due to equal cell sizes, a concern for controlling the error rate across the family of pairwise comparisons, and an interest in all possible pairwise comparisons. The Tukey method, often called the HSD (honestly significant difference) test, is designed to make all pairwise comparisons of means while maintaining the error rate at the pre-established  $\alpha$  level. It tests for the equality of each pair of population means. The test statistic values use of the standardized range distributions rather than the t distributions as the

reference distributions for significance testing (Bickel et al., 1982, p. 388).

Calculations were as follows:

$$T = \frac{\bar{d}}{s} \pm q_{\alpha, df, 1-\alpha} \sqrt{\frac{MSE}{n}}$$

where

$\bar{d}$  is the difference between the two means to be compared;

$q$  is the standardized test statistic

$c$  is the number of levels in the country independent variable;

$df$  is the degrees of freedom of the error;

$\alpha$  is the level of significance;

$MSE$  is the mean square error;

$t$  is the number of levels of treatment;

$n$  is the number of subjects with each cell.

$$\begin{aligned} T &= \frac{\bar{d}}{s} \pm q_{.1, 114, .95} \sqrt{\frac{7.52(1.33)}{3120}} \\ &= \frac{\bar{d}}{s} \pm 1.36 \pm .4212516 = \frac{\bar{d}}{s} \pm 1.42. \end{aligned}$$

Any contrast whose absolute value is greater than 1.42 is statistically significant indicating difference between the means compared.

1. For Americans versus Venezuelans, the difference in group means equalled 1.43 which is greater than 1.42; therefore, there is significant difference between Americans and Venezuelans.

1. For Americans versus Swedes, the difference in group means equaled 2.218 which is much greater than 1.43; therefore, Americans and Swedes differ significantly.

1. For Venezuelans and Swedes, the difference in group means equaled 1.775 which is greater than 1.43; therefore there is significant difference between Venezuelans and Swedes.

It is concluded that the differences were in favor of Americans when compared with Venezuelans or Swedes, and for Venezuelans when compared with Swedes. These differences were a possible indication of cultural and traditional similarities of Americans and Venezuelans (low differences), as compared to Swedes' more cultural and traditional differences (high differences) from Americans. Also there could be a difference in verbal skills. This possible indication therefore needs further research (Appendix A presents the raw data of the six groups).

### The Reliability of the Test

As noted earlier, Kahn and Kevck (1971) found the split-half reliabilities of the test for Venezuelans to be .78. Reliabilities of KR-20 are a more desirable estimate than split-half reliabilities, because the formula is the mean of all possible Pearson (1937) split-half reliability estimates (Kruschak, 1961; Kevick and Lewis, 1967). Therefore, KR-20 has been used in this study. The reliabilities



of the six groups are reported in Table 6. The KR-10 formula used is

$$KR-10 = \frac{1}{1-\frac{1}{N}} \left( 1 - \frac{\sum_{i=1}^N p_i q_i}{N} \right) \quad .$$

where

$N$  is item

$p$  is proportion correct response

$q$  is proportion incorrect response

$\sum_{i=1}^N p_i q_i$  is variance.

The reliabilities for the American control group and for the Saudi Arabian control as well as experimental groups are considered low. The remaining reliabilities have intermediate values. Possible explanations and more discussion of differences in reliabilities will be detailed in Chapter V. Also, Table 7 shows the item difficulties for

Table 6  
KR-10 Reliabilities of the Test

Reliabilities	Experimental Group ( $R_1$ )	Control Group ( $R_2$ )
American Subjects	0.5025	0.3848
Tunisian Subjects	0.5472	0.5741
Saudi Arabian Subjects	0.1814	0.5748

Table 3  
Proportions of Right Answers

Grade	American Subjects		Mexican Subjects		Saudi Arabian Subjects	
	K.O.+I.P. = $TP_1$	I.P.H. $TP_2$	K.O.+I.P. = $TP_1$	I.P.H. $TP_2$	K.O.+I.P. = $TP_1$	I.P.H. $TP_2$
1	.60	.50	.75	.75	.80	.50
2	.85	.85	.70	.70	.50	.60
3	.90	.80	.60	.60	.45	.55
4	.45	.60	.70	.60	.50	.65
5	.40	.50	.20	.60	.40	.60
6	.30	.55	.20	.55	.20	.30
7	.35	.35	.20	.45	.15	.20
8	.35	.45	.40	.45	.15	.40
9	.30	.30	.20	.45	.20	.35
10	.30	.30	.20	.60	.25	.25
11	.45	.45	.30	.30	.20	.20
12	.45	.30	.40	.45	.40	.30
13	.75	.75	.40	.50	.40	.25
14	.80	.80	.40	.20	.20	.20
15	.30	.30	.15	.25	.10	.20
16	0	0	.10	.10	.10	.15
17	.80	.55	.30	.60	.10	.10
18	.20	.40	.25	.20	.20	.10
19	.80	.70	.55	.40	.45	.40
20	.70	.50	.70	.45	.45	.45

each of the 30 items within each of the six groups of students. It reveals that for the Americans considerable differences in item difficulty were found for items 7, 12, 18 and 20 between the experimental and control groups. For Venezuelans, differences were found for items 1, 3, 7, 14 and 17. For Saudis, differences were found for items 1, 13 and 20.

### Summary

In this chapter the ANOVA assumptions were shown to have been met. The interaction hypothesis was not rejected. It is also found that there was no difference between treatment one (using advance organizer plus the learning passage read once) and treatment two (reading the learning passage twice). By using the *t* test procedure, it was found that there were no significant differences in mean scores between the American control group (involved in this study who read the learning passage twice) and the control group in the Hewitt and Dwyer (1980) study who read the learning passage only once. A difference was found among the three nationalities across both treatments, with the greatest difference between Americans and Saudis, then Venezuelans and Saudis, and then Americans and Venezuelans. The differences continue to existing cultural differences among countries and further studies are needed to further investigate the relationships.

A test reliability of KB-88 has been used, showing the low reliabilities for all groups when compared with the Kane and Beach (1971) study. Possible explanations and discussion of differences in reliabilities will be detailed in the next chapter.

## CHAPTER V DISCUSSION AND CONCLUSIONS

The impetus for the present study was provided by the earlier work of Ausubel and Mayer in the field of cognition. A further impetus for this research came from the author's concern with the special learning experiences of foreign students who are acquiring knowledge through the medium of a language which is not their native tongue. Mayer (1974) underlines the importance of studying the use of advance organizers to establish support for assimilation theory which he describes as "one of the main pillars of the modern psychology of learning and memory" (p. 134). He points out that one can hardly read a modern textbook on learning and memory without finding some reference to learning by connecting old ideas with new ideas. The study of advance organizers is a "background" on which one of the main tenets of assimilation theory is being tested.

Mayer's work (1974) demonstrated the role of advance organizers in learning unfamiliar material. (1) Advance organizers will more strongly affect the learning of a poorly organized text, (2) will have a stronger effect for learners lacking in prerequisite knowledge and/or ability, and (3) will have a stronger effect on transfer rather

than retention. Mayer (1976) reported that thirteen of the studies showed better performance for the advance organizer groups. This was evident especially where the subjects were lacking in prerequisite experience or ability.

In spite of the positive findings of Mayer and Anshel, doubt still exists as to the true effectiveness of the role of an advance organizer in the learning process. Barnes and Closson (1975) presented a negative review of 31 advance organizer studies.

One area not previously investigated in advance organizer research is the influence of the varying culture and language of learners. The present study attempted to investigate the possible facilitation effect on learning when advanced organizers are employed with non-native speakers of English whose cultural background is non-Western.

The findings of this study did not reject the first hypothesis in that there are no significant differences between the experimental and control groups. They were the same for the three nationalities.

The second null hypothesis of this study was not rejected in that the tests did not show any significant differences between the experimental group (those who received the advance organizer prior to the learning passage and were permitted to read the material only once) and the control group (those who received only the learning passage and were allowed two readings). These results did not

conform to expectations based on the findings of Isahel (1974) and Mayer's studies (1975b).

The third null hypothesis investigated was related to the significant performance differences among the three nationalities of the subjects in the three experimental groups (the three groups who did receive the advance argument). There is meaningful difference in performance was evident in favor of the American subjects whose native language was English. The American subjects performed better on the posttest than did the Venezuelan or the Saudi Arabian subjects. Furthermore, there was a significant difference in performance in favor of the Venezuelan subjects when compared with the Saudi Arabian subjects who were operating not only in a second language but also from a different cultural background.

Referring to Table 4, it was found that the average mean score for the experimental group of American subjects is 10.1, whereas the corresponding score for the Venezuelan experimental group is 8.1, a difference of 2, which may be attributed to the differences in native language of the two groups. Specifically, the Venezuelans were dealing with material presented in their second language. The Americans did not have this disadvantage. When the scores of the American experimental group were compared with those of the Saudi Arabian experimental group, an even greater difference was observed. The mean score for the Saudi group was 8.15, which indicates a difference of 1.95, compared to the

American counterpart. The poorer performance of the Saudi Arabian group is probably indicative of the cultural differences of language and cultural background.

Comparing the scores of the Venezuelan and Saudi Arabian experimental groups reveals a difference in mean score of 1.48. In this case, both groups were in a learning situation where they were required to acquire knowledge in a second language, but the Saudi Arabian group additionally were functioning with a different cultural background.

Interestingly, there were no significant differences in mean scores between the American control group involved in this study, who read the learning passage twice, and their counterpart in the earlier Maswell and Olejnik (1980) study who read the learning passage only once.

Assael (1974) and Hayer (1975a,b), drawing on their experimental experience, would have predicted an advantage for the advance organizer groups. The use of advance organizers was found most effective when used with limited experience and/or low ability students. The Venezuelan and Saudi subjects could be considered linguistically and culturally different and, therefore, would have been expected to profit from the use of the advance organizer. This prediction was not confirmed by this study.

After considering the findings of this study, it can be concluded that there has been no evidence obtained which might be construed as supportive of the theory of the



facilitative effect of advance organizers where the learning to be accomplished is presented in a language other than the learner's native tongue. These findings are admittedly based upon research with a limited sampling of second language speakers of English.

It appears obvious that further research in the specific area of the use of advance organizers with subjects of different academic levels, language, and cultural background should be undertaken. Specifically, future studies might investigate the effectiveness of advance organizers on subjects who possess the English as a second language characteristic and whose first language is a non-Western language but whose cultural background is more Western than that of the Saudi Arabian subjects used in this study. For example, Japanese subjects might be appropriate for such a study. Also subjects from Eastern European countries could possibly be utilized for such research.

Specific suggestions for future research in these areas are listed below.

#### Recommendations for Future Research

1. The two types of advance organizers, comparative and explication, should be operationally defined. The definition should be applied to existing advance organizers to determine if they meet the criteria of Ausubel's and Meyer's suggested requirements.

1. A basic advance organizer study should be replicated in Hindi-Arabia to determine if the facilitative effects of advance organizers on meaningful learning is a peculiarly Western cultural phenomenon or if the effects may be cross-cultural. Such a study would also give evidence to determine if advance organizers are as useful in the Arabic language as they are in English.

2. An advance organizer study should be undertaken employing non-verbal material, such as literature, history or different sorts of a religion, with undergraduate foreign students for whom Arabic is a second language.

Table 4 shows lower reliabilities of the present study than Ekin and Novak's. This difference can be attributed to differences of American subjects in the two studies. For example, the American subjects of Ekin and Novak's study were elementary education majors in a biology class, while those of the present study are undergraduate education and business administration students. Another difference is that American subjects have read the learning passage twice, while those of the previous study had read it once.

The reliability (Table 5) also shows inconsistencies between control and experimental groups across nationalities. These inconsistencies contributed to the statistical non-significance (Chapter IV) between these two treatments across nationalities.

The general consistency of the reliabilities may also be due to the fact that the reading ability of the subjects was not controlled which would have been an important related variable. This variable has not been controlled, because it is not available in a valid form for subjects speaking English as a second language. Thus, classification results may be the only possible results that can be used instead of reading ability tests. This problem calls for constructing a reading ability test, valid for the subjects that speak English as a second language. It is believed that the random assignment of the subjects to the two groups was sufficient to distribute the varying reading abilities which might have existed in the sample. The chance makeup of the groups is representative of the real world of the classroom.

### Summary

The rationale for the present study stems from an interest in the earlier work of Ausubel and Mayer, and also from a concern with the special learning complications of acquiring knowledge in a language other than one's native tongue. Mayer's study indeed showed that thirteen of the studies under review exhibited a facilitative effect in learning by advance organizer groups, especially when the subjects were lacking in prerequisite experience and ability. As was previously emphasized an advance organizer studies is the effect of culture and language differences.

The present research undertook specifically to test the use of an advance organizer on the learning of non-native speakers of English from different cultural backgrounds.

The subjects were three groups of 44 undergraduate students, American, Venezuelan, and Saudi Arabian randomly distributed to one of two groups. The experimental group read an advanced organizer and 4 learning passage once. The control group read just the learning passage twice. A week later all subjects completed a posttest.

The findings indicated the following:

1. There was no significant difference in posttest scores between the experimental and control groups within the three nationalities. As a point of interest, there was no significant difference between the scores of the present study control groups (who read the learning passage twice) compared with the control groups in the Hamill and O'Leary (1981) study who read the learning passage only once.

2. The American groups who were operating in their own language performed better than the Venezuelans and the Saudi Arabians. In turn, the Venezuelans outperformed the Arabian subjects who had the double handicap of language and different cultural background.

Based on the work of Ausubel (1978) and Meyer (1978a,b) an advantage would have been predicted for the experimental groups of Venezuelan and Saudi subjects, because they would be classified as linguistically and culturally different. However neither group seemed to profit from the use of the

advance organizers. Although the present study dealt with a limited sampling of second language English users, there is no evidence supportive of the effectiveness of advance organizers in facilitating learning for non-native speakers of English.

One recommendation for future studies would be to construct an operational definition of the two types of advance organizers, comparative and expository. Also a basic advance organizer study should be replicated in Hindi Arabic to determine if the usefulness of advance organizers is a particularly Western cultural phenomenon. Finally, an advance organizer study should be carried out using non-science material, such as literature, history or comparative religion, with students who are non-native speakers of Arabic.

The general inconsistency of the reliabilities may be attributed to the fact that the reading ability of the subjects was not controlled which would have been an important related variable. Such a control would have necessitated the construction of a reading ability test. Random assignment of the subjects to the two groups was considered sufficient to distribute the varying reading abilities.

# APPENDIX A

1993 Survey Data on Life Insurance

	American Subjects Experimenters' Control Group	European Subjects Experimenters' Control Group	British Subjects Experimenters' Control Group	Subjects Control Group
1	12	8	8	8
2	12	8	8	8
3	14	8	10	10
4	16	10	12	12
5	18	12	14	14
6	16	10	12	12
7	18	12	14	14
8	12	8	8	8
9	14	10	12	12
10	16	12	14	14
11	18	14	16	16
12	16	12	14	14
13	18	14	16	16
14	12	8	8	8
15	14	10	12	12
16	16	12	14	14
17	18	14	16	16
18	16	12	14	14
19	18	14	16	16
20	12	8	8	8

## APPENDIX B

### ADVANCE COURSEWORK

(from B. John and J. Havel, available from  
J. Havel, Department of Education, Cornell University)

### PASSAGE

### HOMIOSTATICS

### DYNAMIC EQUILIBRIUM

The ability to maintain relatively stabilized internal conditions, even when under stress, is called homeostatic regulation, or more simply homeostasis. The stabilized or steady state conditions that are maintained through homeostatic regulation are key factors in the ability of living organisms to survive.

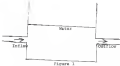
A fundamental trait of homeostatic regulation is that it is self-regulating, that is, it possesses the ability to make corrections for deviations from normal conditions. Sometimes the self-regulatory mechanisms which accomplish homeostasis are division. If the dog becomes too warm, it will probably shake and move to a more comfortable spot in the shade. This movement is obviously a form of regulation, involving activity of the brain.

Homeostatic regulation is present on all levels of life from the molecular to the community levels. The regulatory mechanism functions in much the same manner at all the levels with the degree of complexity being different.

Picture in your mind the image of a ten-year-old boy attempting to walk along the top of a fence. This may help you understand homeostasis better. As the boy slowly moves along the fence, his brain (this regulator which receives messages and sends them is known as a modulator) is continually receiving messages (feedback) from his eyes, ears, etc. The information such through this system keeps the body informed of the position of his body in relation to the fence. Any tilting or swaying by the boy results in feedback information that the brain analyzes in order to issue messages to the parts of the body that carry out activities (the muscle or glands). After continued practice, he may eventually become quite skillful and be able to walk the entire fence with very little swaying; then it can be said that he has achieved a homeostatic relationship. Therefore, the concept of homeostasis is based on the ability of an organism for self-regulation by making corrections for deviations from normal conditions.

The principle of dynamic equilibrium (balance) can be illustrated by a simple analogy. If one compares the organism and the cells that compose it to the flow tank in Figure 1, certain similarities to the dynamic balance of the living system may be noted in the workings of the tank.

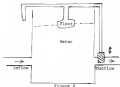




If the amount of water entering the tank is just equal to the amount of water leaving it, the water level will not change and such a system is said to be actively balanced. The circus juggler who maintains an active balance as he juggles several objects keeps them in dynamic equilibrium. Our body processes are regulated so that many such dynamic equilibria are maintained.

Remember that the flow tank is in dynamic equilibrium only when the inflow is equal to the outflow. To arrange a system in dynamic equilibrium, you must regulate either the inflow or the outflow, or both.

Figure 2 illustrates a simple mechanical model that could be used to regulate the water. The outflow would increase when the amount of water entering is increased. If this regulation device operated fast and effectively enough, it would keep the level of water in the tank nearly constant.



In the living organism both the inflow and outflow of the blood glucose (sugar) must vary a great deal from time to time depending on the activity of the body cells, the chemical composition of the food, and many other factors.

The regulating devices that maintain constant concentration in the blood are very complicated. The regulation of a body function such as glucose regulation is much more complicated than the single flow system illustrated by the diagram. Yet, like the flow system, all the mechanisms that regulate the glucose concentration are likely to depend on the glucose concentration itself.

The simplest type of homeostatic regulation is through thermostat-like action. A thermostat-like regulator is one which causes any variation from an acceptable range to initiate a corrective measure and bring the activity back into range. A physical model for the thermostat-like

regulator may be found in the heat-controlling device in our homes. The action of the home thermostat causes the completing or breaking of an electrical circuit. When the circuit is completed, the furnace goes on and the temperature rises. When the circuit is broken, the furnace turns off and the temperature falls. Can you think of an analogy in the human body that functions in a somewhat similar manner?

The second type of homeostatic regulation is through the use of feedback action. A feedback regulator is one in which the accumulation of an end product of the system inhibits (slows) the initial reaction; e.g.



Figure 2

the accumulation of a hormone in the blood would eventually slow up its production by affecting the glands that produce it.

In more complex systems, it is also possible that feedback action may have a stimulating effect (positive effect); e.g. an increase in hormone A produced by gland I may influence gland II to produce more of hormone B.



Figure 4

## APPENDIX C

### LEARNING PASSAGE

(From D. Ewins and J. Novak, available from  
J. Novak, Department of Education, Cornell University)

### PASSAGE

#### HOMIOSTATIC Regulation

In discussing homeostasis, it seems appropriate to use body temperature as our example.

Mammals and birds are homeotherms. Other animals are poikilotherms. Homeothermic organisms are capable of maintaining a remarkably constant internal temperature even though the outside temperature varies over a broad range. A poikilotherm has various internal temperatures dependent upon the external environment. They are often called cold-blooded animals.

The better the homeostatic process, the greater is the independence of the organism, the more the organism can do and accomplish. Consider the frog. It is a poikilotherm. As outside temperature, it can not function. In the winter it hibernates.

To regulate temperature, the brain must interact with receptors in various parts of the body. Signals pass from

the temperature receptors in a part of the brain called the hypothalamus. This structure receives the messages and takes action to oppose the change in the external temperature. Sometimes (for example, human beings) have ways of preventing the losing heat.

The only way metabolic processes can be increased as the external temperature falls is by increased muscle activity. Involuntary muscle activity caused by a drop in temperature is called shivering. If shivering does not produce heat fast enough to offset the loss, the only resource left is to produce heat even faster by vigorous voluntary muscle contraction.

The organism can lose heat by radiation, conduction, and convection. A warm object loses heat to any other object that is at a lower temperature (radiation). Since the temperature of the human body is normally higher than the surrounding air, heat can be readily lost in this manner. For heat loss by conduction, contact is required. Usually it is contact of cold air with the skin or immersion in cold water, etc. This obviously applies also to the human situation. Heat is lost by convection by the movement of air (or water) over the surface of the body. In other words, the air in contact with the skin is heated by conduction, and then the warmed air moves away and cool air takes its place. It is clear then that the faster the air movement (as when one stands before a fan) the greater the heat loss.

Many homeotherms, including man, can cool the body further by sweating. Above 32°C, perspiration becomes a prime factor in the regulation of heat loss.

It should be noted that it is not the rate of sweating that determines heat loss, but rather the rate of evaporation of the sweat. That is why we are more comfortable in hot weather when the humidity is low. The lower the humidity the faster is the rate of evaporation and the greater the heat loss.

The mechanisms available to homeotherms for regulation of heat conservation or heat loss are so effective and so sensitive that the body temperature is maintained since a 37°C is a broad range of external temperatures ranging from subzero to over 40°C. How occasionally something goes wrong and the body temperature rises to produce what is termed as fever. Apparently there is a resetting of the body's thermostat to a higher level. A homeotherm with fever can still control his internal temperature as the external temperature changes, but the resulting body temperature is rarely higher than normal.

Let us look at another example of homeostatic regulation. The hormone has been defined as a substance produced by a ductless or endocrine gland (such as the thyroid or pituitary) and carried by the blood stream to some other part of the body. The thyroid gland lies in the front part of the neck and secretes a substance referred to as thyroxine. This is a very potent substance that regulates

the rate of metabolism by influencing various processes. If there is too much thyroxine secreted, the individual is over-active, nervous, hot, and restless. When there is too little thyroxine, he becomes lethargic, passive, cold and clumsy. What controls the rate of hormone production?

The anterior lobe of the pituitary secretes a hormone called the thyroid stimulating hormone (T.S.H.). As the name implies, the T.S.H. stimulates the thyroid gland to produce thyroxine. The thyroxine, as it accumulates, inhibits release of further production of T.S.H. As thyroxine is used up by the body, inhibition of the pituitary is reduced and T.S.H. increases once again. Under normal circumstances, a dynamic equilibrium results. However, thyroxine is found only if iodine is available; consequently, when iodine is lacking, thyroxine cannot be produced and T.S.H. production is not inhibited. A goiter (swelling of the thyroid gland may result). This condition, called simple goiter, may be corrected or at least controlled, by increasing the amount of iodine in the diet. Production of thyroxine will then allow the feedback regulation to function once more.

Many of the activities of living organisms require the interaction of numerous homeostatic mechanisms. A classic example is the endocrine system. Here the relationship between the pituitary gland, located at the base of the brain, and the ovary is under feedback regulation. A number of different hormones are involved. The pituitary gland



produces a hormone called the follicle-stimulating hormone (F.S.H.) which regulates the growth and development of the ovarian follicles in the ovary. As the follicle grows, it produces a hormone of its own--estrogen. Estrogen has many effects on the body (e.g., the appearance of secondary sex characteristics), but the activity that we are concerned with here is the action that estrogen has on the production of F.S.H. As estrogen accumulates, the F.S.H. production decreases.

Until this point, the action of F.S.H. and estrogen has been parallel with that of T.S.H. and thyroxine. But the picture is more complicated. Estrogen, besides inhibiting F.S.H. production, also stimulates the pituitary to produce the luteinizing hormone (L.H.). One important effect of L.H. is to bring about the ovulation or release of the egg from the ovarian follicle. However, our chief concern with L.H. is (i) an inhibiting effect upon estrogen production, and (ii) a stimulating effect upon the follicle from which the egg was released. The empty follicle (the corpus luteum) is stimulated by L.H. to produce the hormone progesterone. Progesterone accumulates and inhibits further production of L.H., and stimulates production of F.S.H. Thus is a highly complex cycle.

A vital role in homeostatic regulation is played by the brain. In particular, the cerebrum and cerebellum. The brain acts as a coordinating mechanism with specific parts of it functioning in certain homeostatic relationships. For

example, the cerebellum plays a vital role in the control of muscular movement and the hypothalamus is temperature regulation. A breakdown in the functioning of any part of the homeostatic system will upset the dynamic balance of the whole system.

The receptors which receive information about the external environment would include the sense organs: eyes, ears, the degree of touch, taste, etc. Clearly, these can affect homeostatic balance. A simple case might involve a blind-folded person trying to walk down a street. Thus deprivation would affect the individual's balance.

The sensory neurons are those that carry impulses to the brain and spinal cord from all the internal parts of the body. The motor neurons carry impulses to the effectors (muscles and glands) that carry out the responses.

An interesting example of a homeostatic relationship under the influence of the autonomic nervous system is illustrated by variation in the rate of the heartbeat. The autonomic nervous system is that part of the nervous system not under the control of the will. It is composed of two divisions, the sympathetic and the parasympathetic, which exert contrasting effects on the heart rate. The overall effect is coordinated by the heart rate center in the reticular formation of the brain stem. The sympathetic nervous system secretes an adrenalin-like substance which increases the heartbeat rate while the parasympathetic

nervous system secretes an acetylcholine-like substance which depresses the rate of the heartbeat.

The rate of the heartbeat results from a balanced compromise between the two antagonistic parts of the nervous system, the sympathetic and the parasympathetic. The heart rate center sends out bursts or accelerator signals in response to specific sensory impulses which affect it. Among the sensory messages transmitted to the heart rate center, many originate in the circulatory system itself. Sensory nerves lead to the heart rate center from the walls of the venae cavae and the aorta. When these blood vessels become stretched with large quantities of blood, their walls stretch and this stimulates the sensory nerves. If the heart rate center receives impulses from the venae cavae (the large veins coming into the heart from the body), the center speeds up the heartbeat, but if the aorta (the large artery carrying blood to the body) is filled, then the impulses to the center result in the slowing of the heartbeat.

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## BIOGRAPHICAL SKETCH

Muhammed Anwar K. Gaffy Makhdoum was born in Makhdoum City, Saudi Arabia, in the year 1943 Hijrah. The Hijrah, the flight from Makhdoum to Yathrib, counts as the beginning of the Islamic era and corresponds to June 10th, 610 A.D. Mr. Makhdoum's official birth record gives his date of birth as 1364 Hijrah which converts to 1944 in the Gregorian calendar. Converting Arabic calendar dates to the Western system of dating is complicated by the fact that Arabic calendar years vary in length from 351 to 354 days.

Mr. Makhdoum earned his B.A. in education and psychology from King Abdulaziz University, Makhdoum, Saudi Arabia, in 1971, and his M.A. in psychology from the same institution in 1974. From 1972 to 1974 he worked in the field of education in Saudi Arabia and in the Islamic Republic of Mauritania. From 1974 to 1979, he held a position as lecturer in the Psychology Department at King Abdulaziz University, Makhdoum, Saudi Arabia.

In late 1979, he began study for his Ph.D. with a specialization in educational psychology in the Foundation of Education Department at the University of Florida, Gainesville, Florida, USA.



Mr. R. A. Gullig Kallison is married to Nina Samokhova and they have two sons, Boris and Roman.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

  
John M. Hewitt, Chairman  
Professor of Foundations  
of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

  
Gordon L. Shawver  
Professor of Foundations  
of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

  
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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a Dissertation for the degree of Doctor of Philosophy.

  
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August 1940

  
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